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ABSTRACT

A gulf exists between what is known about administration and how this knowledge is used to improve administrative practice. A pilot project, to provide one bridge from theory to practice through an operational model, applies systems analysis to the administration of school districts. The completed operational model, developed in the Maryvale school district in Erie County, New York, explains detailed subsystems for implementing a comprehensive planning-programing-budgeting system (PPBS). It is designed for application in districts of less than 25,000 students in western New York State. (Author/RA)

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AN OPERATIONAL MODEL FOR EDUCATIONAL PPBS

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The purpose of this paper is to present an overview of a current project in the eight counties of western New York aimed at inventing and field-testing an operational Planning-Programming-Budgeting System (PPBS)[1] model for local school districts. The following report of the project will briefly describe: (1) the project's design; (2) invention of the PPBS model during the project's first year; and (3) plans for field-testing of the model in the second year.

Project Design

The general nature of the project is described below through consideration of the following topics:

1. Inception of project
2. The problem
3. Conceptual framework
4. Research and development questions

Inception of Project

The Western New York PPBS Project was conceived by the Western New York School Development Council. The Council comprises scores of school districts which for years have joined together to support a variety of educational services to member districts. This organization's Committee on School Finance and Legislation sponsored a year of preliminary investigation preceding establishment of the project. Council staff members examined research and literature relevant to planning-programming-budgeting systems, and attended professional conferences dealing with this innovative

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[1] A planning-programming-budgeting system is a comprehensive approach to decision making that emphasizes: (1) long-range planning; (2) optimum program activities, selected through a process of systems analysis; (3) economic rationality in the allocation of resources to competing programs; and (4) monitoring and control of program outputs.

approach to the administration of school districts.

This exploration of the potentiality of PPBS for school systems in western New York led to the Council's development of a proposal to ESEA Title III authorities for a project to invent and field-test an operational PPBS model for local school districts of a size under 25,000 pupils. The Maryvale School District outside of Buffalo became the local educational agency that applied for the grant. The project was funded beginning July 1, 1969. Maryvale subcontracted technical assistance for model development to the Western New York School Development Council, and served as the prototype district for model invention. The project's target area comprises the 106 school districts in the eight counties of Western New York.

The Problem

Scholars in the disciplines of Economics, Education and Public Administration -- as well as citizens in local school districts -- increasingly are urging school boards and administrators to adopt newer administrative concepts and techniques that will result in improved educational planning, and attainment of objectives in a manner that affords the most educational benefits at the least cost. These techniques have proved effective in other governmental jurisdictions, notably in the Department of Defense. Local school districts, however, have not yet widely adopted these innovative strategies for improving the effectiveness of operations and the rationality of resource allocations. The reason is simple: most school district personnel do not know how to use PPBS.

The satisfaction of this need for knowledge of how to adapt the concepts and techniques of PPBS to a local school district's operations appeared to be hindered by two major problems. First, no district in the project's target area appeared to have either the skilled personnel, e.g., operations analysts, or the fiscal resources to devote to developing and testing a practical PPBS model. Second, no other agency had yet

developed and implemented a project which would accomplish for school districts of fewer than 25,000 pupils what the Rand Corporation accomplished for the Defense Department during the 1950's. The Rand Corporation experimented with PPBS and its applicability for the decision making problems of the Defense Department for ten years before Robert McNamara introduced that system there in 1961. Furthermore, no developmental project appeared to be underway that promised to provide a PPBS operational model for the typical Western New York school district.

The solution to these problems appeared to be the establishment of a research and development project that would design a management system for local school districts which would integrate the functions of (1) setting explicit objectives; (2) developing programs to meet the objectives; (3) planning optimum program activities on a multi-year basis; and (4) relating budget allocations to those objectives, programs and multi-year plans. In short, an operational model appeared to be needed that would present the answers to many questions about what board of education members, chief school officers, and other staff members actually are to do in order to use PPBS.

Conceptual Framework

In developing the operational PPBS model, the project staff was guided by certain concepts from systems theory and by a number of research and development questions prompted by those systems concepts. These systems guidelines and the developmental questions are presented below.

Selected Systems Guidelines. We found four concepts from general systems theory especially useful in guiding the design of the PPBS model. They are listed below, with the definitions we found helpful.

1. System: an entity, conceptual or physical, which comprises a set of elements standing in interaction or interrelation. The notion of a system appears to be a powerful conceptual tool for gaining holistic perspective on an organization, and for reducing an administrator's problems to manageable size through the designation of subsystems.

2. Environment: a portion of the universe outside of a system that affects and is affected by the system.

   This concept helped us to realize the need for designing an open system, i.e., the systematic interaction of the school district organization with its local community and the national community.

3. Alternatives: a set of possible courses of action; through a process of rational choice, one course of action is selected as optimum.

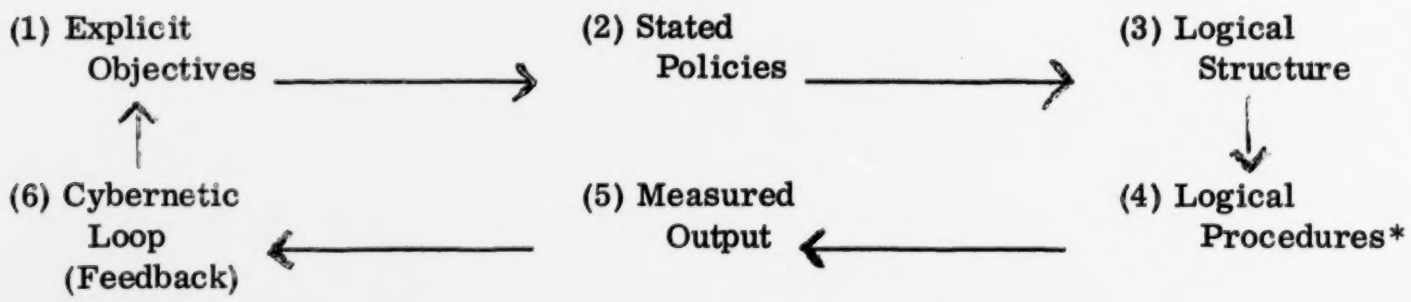
   This notion helped the project staff to think about choices concerning objectives and methods of accomplishing objectives as design elements of the model.

4. Feedback: an arrangement whereby an output of a process is measured and compared with a preset standard, leading to corrective action if output deviates from that standard. The project staff felt that perhaps the element most often missing from an administrative system is that of feedback-control, and that the design of a PPB system would not be complete unless it provided mechanisms for monitoring system outputs and comparing them to desired outputs.

Administrative System Process Model. To synthesize the systems concepts identified above, a simple model was sketched. This model postulates six process

components to be found in any administrative system: (1) explicit objectives; (2) stated policies; (3) logical structure; (4) logical procedures; (5) measured output; and (6) cybernetic loop (feedback). Figure 1 presents these administrative system components in graphic form.

Figure 1. Administrative System Process Components



*Logical procedures specify and interrelate the process elements of energy, materials, and information. (For a discussion of these elements, see Richard A. Johnson, Fremont E. Kast, and James E. Rosenzweig, The Theory and Management of Systems (second edition, New York: McGraw-Hill Book Company, 1967), Chapter 6.)

This model provided a framework for generating the following research and development questions that specifically guided the design of the operational PPBS model.

Research and Development Questions

In developing the model for PPBS, the project staff sought answers to the following questions:

1. What is the nature and extent of the commitment of the governing board needed to implement a planning-programming-budgeting system?

2. What are the boundaries of a PPB system?

3. What sensory devices are required to monitor the community's educational needs for the purpose of translating them into educational objectives?

4. What arrangements for organization and staffing are needed to design and operate a PPB system?

5. In what manner must school district objectives be stated for the effective implementation of PPBS?

6. How can a school district's objectives be translated into program objectives and a program structure?

7. How can cost-benefit analyses be conducted by a school district to propose alternative methods for accomplishing program missions?

8. What administrative arrangements are required to choose the optimum method for accomplishing program missions?

9. How are approved programs translated into long-range (5 year) and short-range (1 year) financial plans?

10. How is the short-range (1 year) financial plan implemented?

11. What is the nature of a PPB system's cybernetic--or feedback--mechanisms?

12. What is a useful format for the PPBS model?

Invention of Operational PPBS Model

The preceding observations have established the background for the Western New York PPBS Project. The present section of this paper describes the accomplishments of the project during its first year. In brief, the 1969-70 year was devoted to inventing the operational PPBS model prior to field-testing it during 1970-71. These invention activities and the contents of the PPBS model are discussed below.

Model Specifications

The specifications for model design stated that the model would be: (1) manual in nature, i.e., non-automated (because of project-budget limitations); (2) illustrative in nature, not prescriptive; (3) generalizable to all districts in Western New York under 25,000 pupils (all 106 districts except Buffalo); (4) simple in design and concrete in detail so that existing district personnel who are not systems specialists could use the model; and (5) the format of the operational model would be that of a systems manual

with illustrative policy statements, organization charts, functions lists, flowscript procedures[1] and job outlines[2].

Organizing Activities

The project was organized through the following activities:

1. Retaining a central project staff comprising two full-time systems analysts, one part-time systems analyst, one part-time systems director and a full-time secretary.

2. Identifying and orienting a pilot school district advisory committee, and representatives from two participant-observer districts.

3. Identifying and retaining senior consultants for the project: Dean H. Thomas James of Stanford University, and Professor Harry Hartley of New York University.

4. Specifying the boundaries for the PPB system. This activity led to the specification of a set of three boundaries: (1) national education community; (2) local community; and (3) local school system, with subsystem boundaries. Concerning the latter, the project staff determined to include all learning systems, all facilitating systems and all control systems.

Following these organizing activities, the process of model invention began in earnest.

Nature of Planning Component

A central concern of the PPBS model's planning component is provision of sensory mechanisms to insure that ideas from within and without the school system are

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[1] A flowscript procedure specifies a set of interrelated work steps and their logical sequence, as required within a cycle of tasks. The flowscript procedure resembles a stage script in its reliance upon an actor-action format. It is a verbal flowchart. See: Leslie Matthies, Systemation: A Semi-monthly Letter on Systems Trends and Techniques, Number 97, 1962; and Numbers 114 and 115, 1963.

[2] A job outline is a one-man procedure; it usually specifies how an actor performs a single task, or work step, that is designated in a flowscript procedure. Thus, it elaborates a task whenever more detailed work information is desirable.

fed into the district's planning process. The external sensory mechanisms systematically assess local community opinion about the schools, and the views of national scholars about future developments in education. The internal sensory mechanisms systematically assess the opinions of staff members and students about the operations of the schools.

The planning component contains 23 illustrative procedures which are grouped into the following 6 categories:

1. Sampling opinion from local and national sources (referred to above as external sensory mechanisms).

2. Forecasting local community and school system population trends.

3. Preparing 5-year school district revenue forecasts.

4. Determining building needs and capital outlay and debt services expenditures.

5. Planning and executing standardized testing activities.

6. Collecting student and staff opinions about school district affairs (referred to in the paragraph above as internal sensory mechanisms).

These procedures are presented in both narrative-summary form and in flowscript format.

Other elements of the planning component provide: (1) illustrative statements of policy aimed at legitimizing, at the school board level, the implementation of PPBS in a school district; (2) a master flowchart for the PPB system; (3) a school district PPBS organization chart; and (4) a functions list for each work-package on the organization chart.

Among the functions lists are one for a District Planning Council and one for an Educational Planning Council. The aim of these two councils is to open-up the planning process by involving representatives of the various subpublics which have an interest

in educational decision making. Specifically, the District Planning Council serves as a link between the school system and its community. Membership from within the school system consists of representatives of the board of education, administrative staff, teaching staff, and students. From the community, membership consists of certain community influentials, PTA representatives from each school, and other members of the community known to be actively interested in school affairs.

The central task of the Educational Planning Council, made up of the chief school officer's central cabinet and the various program directors, is to review and recommend program plans for incorporation into the district's multi-year master program plan. This body recommends program priorities if the master program plan cannot accommodate all the requested individual program plans.

Nature of Programming Component

The model's programming component contains an illustrative program structure based on the notion of three types of work--direct, support, and command-- and Likert's linking-pin theory.[1] The latter recommends structuring an organization so that the functions of key actors are operationally interlocked rather than isolated. The program structure inclines toward a decentralized operation of PPB rather than a heavily centralized mode of operation. For example, in the instructional program category individual schools are specified as separate programs.

The programming component also presents illustrative objectives. We find it useful to differentiate between the terms goals and objectives through use of the

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[1] Rensis Likert, New Patterns of Management (New York: McGraw-Hill Book Company, 1961).

following definitions:

Goal: a continuing purpose that provides a sense of direction through time.

Objective: a measurable result desired within a specified period of time. It closes a gap between the present situation and the desired situation, within a time-frame.

The programming component presents illustrative flowscript procedures for developing multi-year program plans which commence at the basic operating levels; the proposed program plans then flow upward through review points involving the respective program directors, the Educational Planning Council, the chief school officer and the school board. Feedback mechanisms are specified so that program directors can know the effectiveness of approved and executed plans.

A central feature of the programming component is the presentation of an illustrative, detailed cost-benefit methodology. The aim of this procedure, which is known as an Instructional Systems Analytical Study, is to illustrate a means of selecting from among alternative methods for mission accomplishment an optimum method, i.e., the one that appears to promise the most benefit at the least cost. This methodology is essentially non-mathematical; it relies heavily upon considered professional judgments, including those of outside specialists, through an adaptation of the Delphi technique[1] for gaining consensus.

Nature of Budgeting Component

The primary concern of the budgeting component in the Western New York PPBS Model is to specify: (1) procedures for developing a multi-year finance plan to

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[1] Norman Dalkey and Olaf Helmer, "An Experimental Application of the Delphi Method to the Use of Experts," Management Sciences 9 (3): 458-67; April, 1963.

accompany the multi-year program plan; (2) a multi-year cost projection technique; and (3) procedures for budgetary control that will permit flexibility of expenditures on the part of program directors, within approved budget appropriations. An illustrative design is presented for an accounting code that can facilitate conversion of the traditional line-item budget to a program budget. Also included is an illustrative outline for the contents of a program budget.

In all of its procedures, the operational model is designed to clearly illustrate to educators who are not sophisticated in systems techniques: which actors need to perform what tasks, and how the tasks are to be performed, in order to actually implement PPBS in a local school district. The purpose of implementation, of course, is to improve the rationality of decisions concerning program plans and the allocation of resources.

Plans for Field-Testing of PPBS Model

Thus far we briefly have described the background of the Western New York PPBS Project, and its accomplishments during the first year of operation--July 1, 1969 to June 30, 1970. The concluding section of this report will present the project's plans for the second year of operation.

We will field-test the operational PPBS model in four school districts during the year July 1, 1970 - June 30, 1971. Each district will receive an intensive five-day seminar in the fundamentals of the systems approach to administration, and in the nature of the Western New York PPBS model. This will be followed by development of a readiness inventory which will assess the level of sophistication of the district's staff members with regard to the systems approach and PPBS. With results of the readiness inventory as background information, the project staff will work with a PPBS Task Force in each of the pilot districts to develop for each district an implementation plan. This plan will specify which elements of the model the district would

like to try-out during the year. It appears that the model is too comprehensive for any one district to plan to implement all of the scores of subsystems in a single year. Hence, our desire is to test elements of the model in more than one district.

Following the generation of these implementation plans, the project staff will render consultant service in each district averaging one day a week, to assist pilot staff members in actually trying-out the selected elements of the PPBS model. Near the end of the second year, the project staff will work with the PPBS Task Forces to evaluate the effectiveness of the PPBS elements implemented, and to recommend further implementation steps for ensuing years. The project staff will record the pitfalls and the triumphs experienced in field-testing the operational model in the four pilot districts, and use them to refine the model. Thus, by June 30, 1971 western New York expects to have a field-tested, debugged and refined educational PPBS model.

Summary

The Western New York PPBS Project has concluded its first year of operation, during which it has invented an operational model for the application of PPBS to local school districts. The operational model is in the form of a systems manual that hopefully details with rationality and specificity which actors inside and outside of the school system need to perform what tasks, in what manner, to implement PPBS. The model is comprehensive, with scores of integrated subsystems, and is rooted in systems theory.

The next phase of the project will involve field-testing and model refinement in four pilot districts during the year 1970-71.

The experience so far in Western New York indicates that numerous educational agencies can work cooperatively and effectively together to mount on a regional basis a research and development project that likely would not be feasible for any one district

to mount on its own. The PPBS project has represented a synergistic affiliation among personnel at the State University of New York at Buffalo, who have provided much of the technical assistance for model development; the Western New York School Development Council, comprising, as indicated earlier, scores of districts joined together on a dues-paying basis for mutual benefit; local school districts willing to serve as pilots to help invent and test some of the newer planning and analytical technologies for education; and the New York State Education Department which has provided encouragement and funding for the project.

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